Degree Project in The Built Environment

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Stockholm: The edible city

An explorative study on the inclusion of edible perennials in Stockholm’s public green spaces

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'The parks in Stockholm are not merely a collection of extraordinary green fingers which tie the outlying countryside to the very center of town; they are part of the Swedish conception of life – a conception which demands contact with the freedom of nature in order to offset the indoor restrictions of man'

- Smith, 1957, p.233

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Abstract

This study explores the inclusion of edible perennials in Stockholm's public green spaces by examining the challenges and opportunities from both the governmental perspective and citizens perspective. Food production in cities has proven to enhance quantity and quality of food accessibility to low-income households and can be a useful tool to address urban injustice on food availability in Sweden, where the inflation crises has significantly increased food prices and doubled the amount of people needing food support. Stockholm, the capital of Sweden, has great potential for food production and can benefit from the accompanied social benefits.

In this study, a survey was conducted among citizens of Stockholm municipality and semi-structured interviews have been carried out with different governmental bodies. Inductive thematic analysis was employed to analyse the qualitative data from the interviews. To compliment the discussion, an interview with an expert was conducted in the final stage of this study.

The results of the survey showed extensive support for the inclusion of edible perennials in public green spaces as well as high willingness to participate in the initiatives and an increase in visits of the places when food production was included. In the interviews with park engineers and landscape architects, concerns were raised including privatization of public land, responsibility and maintenance issues, and the need for engaged district administrations. The opportunities were seen in the multifunctional benefits of food production in public green spaces, enhanced food security and the importance of citizen dialogue and citizen involvement in public green space planning. The interview with the expert showed high feasibility for the inclusion of edible perennials in public spaces, emphasising the potential for future practices.

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1. Introduction

Unexpected events, awareness of climate change and the increasing world population have resulted in rising concerns about our food supply system. Together with climate variability, food uncertainty is among the main concerns of the 21st century (Afreen, 2023). The importance of food security and contributory a growing consciousness of the origin of our food have resulted in increased interest in local food production. Due to global urbanisation processes, there is an upcoming approach towards sustainable food production in cities: urban agriculture (Ackerman et al., 2014). The concept is not merely about the production of food in cities, it asks for a different approach towards how food is produced, where it comes from and about reconsidering the use of natural resources in an urban environment (Vejre & Simon-Rojo, 2016). Urban agriculture has the potential to be resource efficient, shorten the agriculture supply chain and it can be integrated into the city scape to repurpose ideal, under- utilized and unused urban infrastructure (Unity Environmental University, 2024). Moreover, urban agriculture is a multifunctional concept, substantially enhancing cities' social, environmental and economic sustainability (Ackerman et al., 2014; Dona et al, 2021).

Sweden, known for its commitment to sustainability, has the lowest self -sufficiency rate of Europe (Stockholm capital of Scandinavia, 2019). In addition, the inflation crises has resulted in a 20% increase in overall food prices and doubled the amount of people needing food support (Roy, 2023). There is a pressing need for increased food security, in which urban agriculture can play an important role. Urban agriculture has proven to enhance the quantity and quality of food accessibility to low-income urban households (Ackerman et al., 2014), and can therefore be a useful tool to address urban injustice on food availability in Sweden. Stockholm, the capital of Sweden, has great potential for urban agriculture practices according to its land availability for cultivation and citizen interest (Stockholm capital of Scandinavia, 2019; Bonow et al., 2020). Moreover, Stockholm can benefit from the accompanied benefits of urban agriculture. The city is struggling with social segregation and there is a demand for more and improved public spaces (Stockholm stad, 2018a).

Food production in cities is broadly referred to as urban agriculture but can include different practices. One of these practices is food scaping. The principle of food scaping involves the inclusion of edible plants to create edible landscapes (Mondor, 2019). Food scaping in parks has proven to provide several contributions, including creating local food supply chains and increased food security (Makinster, 2022). Furthermore, it has the potential to enhance the awareness of the origin of food and provide educational purposes. The production of fresh fruits and vegetables in public spaces for the public to harvest is a known phenomenon in municipalities in Canada and the United States (Nordahl, 2014). In Sweden, these places are less recognized. Nevertheless, cities are experimenting with the integration of food production in public spaces. Lund, Örebro and Västerås have integrated edible landscapes in public spaces, as a forest garden, edible play environment and a field with meadow flowers (Spetz, 2022). These edible landscapes result in a greater conception of the environment and are well received by politicians and the public (Ibid).

In this research, the feasibility of increased food production in public spaces in Stockholm is discussed. In this study, food production is considered as the outdoor cultivation of food, evaluating practices of food scaping in public green spaces. The food that is produced in this way includes fruits, vegetables, nuts, herbs and flowers. The current organisation of gardening practices in Stockholm is based on citizen volunteers, where the involvement of the government is limited to providing lease agreements for citizens to cultivate the land. There is no active involvement of the local government in the food production and the management of the gardens rely on volunteers, which has resulted in various challenges (Bonow and Normark, 2018). In this study, opportunities for the city to be more engaged in the food production process are being examined by including edible perennials in public green spaces, which are managed by the local government. Therefore, when discussing the feasibility of upscaling food production in public spaces it is necessary to understand the perspective of the government. Furthermore, the implementation of food production in public green spaces asks for rethinking the use and function of these places. Since public green spaces are frequently enjoyed areas

in Stockholm and meant for the city's inhabitants, the citizens view is an important factor that needs to be considered. According to Makinster (2022), there are few studies on community and city interest towards food production on public land. The objective of this research is to strengthen the literature by studying both the perspective from the local government and the citizens towards the inclusion of food production in public green spaces in Stockholm.

Therefore, the aim of this research is to explore the feasibility of food production in public green spaces in Stockholm, by examining the challenges and the opportunities towards the inclusion of edible perennials in public green spaces, including both the governmental perspective and citizens perspective.

The main research question that this research intends to answer is;

What are the challenges and opportunities of including edible perennials in public green spaces in Stockholm?

This question is answered with the use of the following sub-questions;

1. *How do inhabitants of Stockholm municipality view the inclusion of edible perennials in their public green spaces?*

2. *What are the challenges and opportunities of the inclusion of food production in public green spaces from the governmental perspective?*

To answer these questions, interviews will be conducted with different government bodies involved in different processes regarding public space planning and management in Stockholm. Furthermore, an online survey will be carried out among inhabitants of Stockholm municipality. With the information obtained from the survey and interviews, an in-depth discussion will take place about the challenges and opportunities regarding the inclusion of edible perennials in public green spaces in Stockholm. The discussion includes linkages to existing policy documents regarding urban green space planning in Stockholm and is strengthened by information obtained from an interview with an expert working in projects regarding the integration of edible perennials in public spaces across Sweden.

This research starts with a literature review in which the main concepts and previous research about the topic are explained. After the literature review, the used methods are explained and evaluated. Hereafter, the results of the study are given and discussed. Lastly, the conclusion is provided and suggestions for future research are presented.

2. Literature review

2.1 Edible cities

The idea of edible cities is understood as a strategy to guide sustainable transformations. Edible cities use their public spaces for food production to achieve nature-based solutions (NbS) (Sartison and Artmann, 2020). Food production in public spaces fosters the quality of life, social cohesion, pro-environmental behaviour and human-food connections (Świąder et al., 2023). Successful implementation of edible cities requires understanding of the motives and challenges of urban food production. Drivers and constraints of edible cities can be viewed as framework conditions which influence the implementation of food production in cities (Sartison and Artmann, 2020). According to previous studies, the main drivers are social and include civic engagement and participation, utilization of established collaborations within the city government, educational support and access to local, fresh and organic food (ibid). Political support from influential parties has also been indicated as an important driver. Moreover, since edible cities have a multifunctional character, different departments and topics in the local authority can be addressed for upscaling the edible city. Edible cities can include different practices of food production and can be achieved through bottom-up approaches as well as top-down approaches, depending on the existing regulations. Bottom-up approaches are marked by shared responsibilities and involvement of citizens and non-governmental organisations (NGO's), whereas in top-down approaches, the city takes responsibility. Depending on the motivation, both approaches can be favourable. In Stockholm, the existing policies regarding urban agriculture in the city are based on bottom-up approaches. However, according to existing challenges, a more involved government might be favourable.

2.2 Urban green space governance

There are different governance structures when it comes to the governance of urban green spaces and the involvement of stakeholders. According to MacKenzie et al. (2018), they can be categorised into four structures: governmental, deconcentrated, delegated and devolved. When there is a governmental structure, the government functions as a single decision-maker. In deconcentrated governance, the decision-making is spread across various levels of government and public authorities. When the governance is delegated, the decision-making is delegated to semi-autonomous organisations and in devolved governance, the decision-making is assigned to local authorities. Due to increased complexity of management of urban green spaces, new forms of collaboration and governance are developed in governments by including other actors (Casprini et al., 2023). These actors can include citizens, non-profit organisations and private companies. Collaborative governance and multi-level governance are expected to increase social justice and lead to higher quality of nature-based solutions (NBs) in urban green areas. Furthermore, when decision-making is distributed among different stakeholders, the risk of unequal distribution of benefits among citizens can be reduced since this is based on the accessibility of the spaces (Casprini et al., 2023).

Edible cities are considered as NBs (Świąder et al., 2023). NBs are interventions that enable the protection, sustainable management and restoration of natural and managed ecosystem, while also offering benefits for both human welfare and biodiversity (PBL Netherlands Environmental Assessment Agency , 2022). Food production in public spaces is used to foster quality of life, social cohesion, pro-environmental behaviour and human-food connections (Świąder et al., 2023). With the expected benefits of collaborative governance and a multi-level governance, it can be argued that this type of governance is favourable both when it comes to the general design, development and management of urban green spaces and when the spaces include food production.

2.3 Public spaces

Public spaces can be either truly public or perceived to be public (Nordahl, 2014). True public spaces are owned and maintained by municipalities and include plazas, parks and squares but they can also include inside spaces like parking lots and municipal buildings (Ibid). When defining public spaces, ownership, management, accessibility and inclusiveness are important factors to consider (Lee & Scholten, 2024). In this research, the public spaces that are discussed are public green spaces, referring to outdoor public spaces. Public green spaces have become increasingly important due to urbanisation processes and rising awareness of the urban heat island effect. Public green spaces in cities offer various ecosystem services and are important places to consider for the well-being of citizens. Ecosystem services are the advantages derived by people from ecosystems, arising from the interactions between ecosystems and human societies (Balvenera et al., 2016). Sustainable planning and management of the spaces is needed to ensure efficient utilization of the spaces to maximise the advantages of the ecosystem services.

Urban green areas can either be characterised as urban commons or club goods (Casprini et al., 2023). Urban commons refer to benefits obtained from places where ecosystem services can be enjoyed freely, whereas club goods are benefits from ecosystem services that are restricted to certain residents although they are also publicly available. Stockholm is identified as one of the most rapidly urbanising areas in Europe (Borgström et al., 2021).The rapid urbanisation processes and limited availability of public spaces make it important to prioritise urban commons, since it increases the population which it can benefit. Urban green areas are defined as urban common when the ownership is public or community based and when there is free access for all members of the community without any conditions. According to Franck and Huang (2023), public spaces imply spaces which are, besides freely accessible, places where different types of people spend time and interact, and where different kinds of activities take place. Therefore, public green spaces should include various functions to ensure efficient use for different types of citizens.

Public places are important places for cultural interactions and societal dynamics (Eckersley & Vos, 2022). These places are spaces were people feel part of a collective and encounter a sense of belonging. Individualism has increased over the past decades, making the sense of belonging to a collective highly valued in current societies (Costa Santos., 2017). The sense of belonging can be increased by making public spaces attractive for different kinds of people, varying in e.g. age, ethnicity or gender. Implementing different functions in public spaces can result in this variety. Outdoor gyms, soccer fields, children play areas and picknick tables are examples which can enhance the diversity of visitors. Moreover, implementing urban agriculture practices can also be beneficial. Food production and growing your own food can be interesting for a diverse group of people and can result in a diverse public. Furthermore, due to its social aspect of growing food together, it can have contributing benefits including enhanced social cohesion and integration.

2.4 Citizen involvement in public space planning

The importance of community involvement in the decision-making process for shaping urban environments revers all the way back to ‘the right to the city’ in the 60s. This term, first mentioned by Lefebvre, indicates a cry of protest against the continuous commodification of everyday life and a demand for increased participation in decision-making (Hossler and Casey, 2016). The freedom to make and remake our cities ourselves is, according to Harvey (2008), one of the most important, yet neglected human rights. The importance of citizen involvement as well as the representation of citizens interest in urban planning processes, have been incorporated in various strategies during the shift towards more bottom-up approaches, especially regarding public spaces.

In Sweden, the demand for participation became prominent in the 1970s and a new planning and building act was incorporated to include consultancy with the general public (Vestbro, 2012). This

new politics of urban planning has been incorporated in various urban planning strategies in the form of citizen participation programs to enhance active engagement of communities. However, although this law was implemented formally, it has resulted in several challenges in Stockholm. One of the main challenges, as experienced by Vestbro (2012), was that the proposals are presented to the public late in the process, when they are often already set and closed for changes. Furthermore, the language in these proposals is often hard to understand for the citizens. In this research, policy documents regarding public green space planning in Stockholm are being analysed to understand to what extend citizens are involved in the process and how citizens interests are being represented.

Depending on the room for collaboration and participation allowed by governmental bodies and the willingness of the citizens to change the existing situation, various types of public engagement can be distinguished. An active form of public engagement are citizens initiatives. Citizens initiatives are the result of overlooked needs which are insufficient addressed by the government. During the last years, grassroots initiatives in relation to public spaces have increased, indicating a process of urban regeneration (Fassi and Galuzzo, 2022). This is also the case for urban gardening initiatives in Stockholm, which have grown significantly over the last years and indicate an increased interest in gardening (Bonow and Normark, 2018). This increase emphasises the value of local and sustainable food production experienced by citizens in Stockholm and the need for more places for cultivation. Moreover, it emphasises that this need is insufficiently addressed by the government since active involvement of the public is crucial to achieve more places for growing food. Involving local communities in the design of public spaces also leads to an enhanced sense of belonging (Fassi and Galluzzo, 2022). Making people consider public spaces as their own by involving them in the process results in places being cared for, maintained and preserved (Ibid). Therefore, since edible perennials need increased care and maintenance, involving citizens in the process can be seen as an opportunity for the implementation of food production in public spaces.

The survey conducted in this study aims to provide an inside in the scope of the demand for increased cultivation in the city and the willingness to engage in the practices. High levels of support and participation are main drivers for food production in cities (Sartison and Artmann, 2020). Therefore, these are important factors to understand when discussing food production in cities.

2.5 Public green spaces in Stockholm

2.5.1 Organisation and governance

The municipality of Stockholm is divided into 11 city districts: Bromma, Enskede-Årsta-Vantör, Farsta, Hägersten-Älvsjö, Hässelby-Vällingby, Järva, Kungsholmen, Northern Inner City, Skarpnäck, Skärholmen and Södermalm (Stockholm stad, 2023b). Each city district is governed by their own district administration (*Stadsdelsförvaltningar*). The elected representatives of the city district councils decide what to prioritise in the different areas. The district administrations are responsible for various operations in their city district, including the maintenance of the public spaces. In the district administration, park engineers ensure that the maintenance is being carried out properly. Currently, district administrators hire companies to carry out the practical work. Contracting out green space maintenance service has been a common practice among local authorities in Sweden since the 1990s (Randrup et al., 2017). The companies work on a contract basis for the district administrations.

The overarching governmental body of the city districts is Stockholm municipality, Stockholm stad, which carries out the design and development of the public spaces as well as the large investments and includes the development office (*Exploaterings kontoret*) and traffic office (*Traffikkontoret*). The development office owns the land in the city and initiates planning and developments. The office consists of among others, landscape architects. The landscape architects develop and design the publics squares together with other experts. The development office is, together with consultants, also responsible for the type of vegetation in the outdoor public places. The traffic office carries out large

investments in public spaces as well as the development of the main parks. Furthermore the office can be seen as the central administration who develops the general guidelines to ensure that the different district administrations are following the same policies. The development office as well as the traffic office work closely together with the district administrations and there is always a certain dialogue between the district administrations and local citizens. The importance of citizen involvement in public green space planning is also frequently stressed in existing policy documents *(see paragraph 2.5.2)*. The need for inclusive public participation in green space planning is a general international trend, also in green space maintenance activities (Randrup et al., 2017). Moreover, there is another general trend that can be distinguished. Increased interest in local developments, areas, use and produce is shown among the users of green spaces. This increased public involvement offers future cooperation and development of green space management in Sweden (Ibid).

The responsibility for the planning, implementation, and management of parks and natural areas in Stockholm is shared by various committees and company boards in different governmental levels (Stockholm stad, 2017). This shared responsibility necessitates collaboration between administrations and companies, along with effective governance and coordination among policy documents concerning parks and natural areas. The decision-making process is done in close collaboration between various governmental levels. Although the decisions are guided by politicians who decide what to prioritise, Stockholm stad decides how public spaces should be developed and designed. How the spaces should be maintained, is decided by the local government, the district administrations, which are provided with a certain budget to generate the maintenance. According to Stockholm stad, there is always a certain dialogue between the local government and citizens when developing and designing public spaces (Stockholm stad, 2017). Considering the benefits of collaborative governance with multiple stakeholder involvement in urban green space planning, more collaborative governance models could profit urban green space planning in Stockholm. Therefore this study compliments the discussion of food production in public green spaces by putting the current governance structure under scrutiny and discussing the shift towards a more collaborative structure.

2.5.2 Planning policies and strategies

The metropolitan region of Stockholm is one of the two regions with mandatory regional planning in the Planning and Building Act (PBL) in Sweden (Adem Esmail et al,. 2022). The regional plan is not legally binding but guides municipal decisions regarding comprehensive and detailed plans (Ibid). To discuss the inclusion of edible perennials in public green spaces in Stockholm, it is necessary to understand how these plans are made and how public spaces are planned and designed. In this paragraph, policy documents and strategies regarding the planning and design of the city, with in particular urban greenery, are explained and discussed. Furthermore, although no general guidelines for urban agriculture practices in Stockholm have been established yet, it is mentioned when the document includes references to urban agriculture practices to understand to what extent it is acknowledged and valued by the government, indicating the possible support. First, the broadest documents are addressed and later on the more specific documents.

The policy document that includes the most generous ambitions for the city is *Vision Stockholm 2040,* emphasising ‘A Stockholm for all’. It describes a city which is balanced between social, economic, ecological, and democratic values (Stockholms stad, 2017). The vision is mainly focussed on education, equality and businesses and emphasises a good and attractive living environment. Parks and green spaces are mentioned in a broad sense with a focus on climate adaptation and citizens engagement. Noticeably, the vision includes urban gardens as a stimulator of outdoor activities and spontaneous movement (Stockholm stad, 2020).

A more specific strategic document for city planning is the *Comprehensive plan of Stockholm* (Stockholm stad, 2018b). This document provides general guidelines for all urban developments in Stockholm and is also known as the masterplan. The plan includes visions for the future urban

developments of the city. The starting point for all urban developments is that Stockholm should be a growing, cohesive, climate smart and resilient city with good public environment (Stockholm stad, 2018a). These objectives emphasise the need for improved public spaces: 'A central task for urban development in the coming years is to develop Stockholm's public spaces – streets, squares, parks and paths' (Stockholm stad, 2018a p.25). Green spaces, natural areas and public spaces are highly valued and linked to the attractiveness and identity of the city. As Stockholm's population continues to grow, efforts are needed to ensure the quality of these places. Values that create a vibrant city life are important to consider and new ideas are welcomed, including urban farms: 'Initiatives such as temporary parks, mobile food services, urban farms and markets have also added new ingredients to urban life, creating a richer, more flexible and dynamic city' (Stockholm stad, 2018a p.20).

The guidelines for the parks and natural areas in Stockholm are described in the policy document *Grönare Stockholm* (Greener Stockholm). Grönare Stockholm builds on the vision Stockholm 2040 and Stockholm's comprehensive and environmental plan, which have the overarching goal of access to parks and nature of high ecological and recreational value for all Stockholmers (Stockholms stad, 2017). This goal emphasises the focus on urban commons and hence inclusive green spaces. The purpose of the document is the establishment of general guidelines based on the city's vision and goals. The document includes the planning, implementation and management of these places and clarifies how the parks and natural areas should be approached in the long term (Stockholm stad 2018b). Since parks and nature areas are part of several different policy domains, the document stresses the need for collaboration within the city's organisation and increased citizen participation: 'the city's work on green issues must always be characterized by co-creation and participation through dialogues and increased information, from consultations on the overarching planning to discussions on the management of the local parks' (Stockholm stad, 2017 p.14). This notion of co-creation emphasises the need for co-production of public spaces in Stockholm by including citizens in public green space management.

According to a survey, nine out of ten inhabitants of Stockholm view the city environment as pleasant, however, the satisfaction with the cleanliness and maintenance of parks and nature is lower (Stockholms stad, 2017). District administrations are responsible for the operation and maintenance of parks and natural areas and develop local park plans, which include maps, lists of green public land within their responsibility and provide knowledge about the values, main features and structure. The knowledge of new approaches to maintain parks according to increased multifunctionality and ecosystem services needs to keep on developing. The knowledge about the importance of urban greenery and natural areas has increased by value creation through ecosystem services, especially regarding addressing climate change (Stockholm stad, 2017). In the document, ecosystem services are mentioned as an important tool for urban development and should be implemented in economic decision regarding exploitation and management. Furthermore, the values that citizens appreciate the most should be preserved, including new approaches: 'This also involves enhancing the green qualities through innovative approaches, a broader perspective on the city's public spaces, and increased participation from Stockholmers' (Stockholm stad, 2017 p. 13).

Densification and growth of the city stresses efficient use of public spaces and the creation of multifunctional parks. Furthermore, it emphasises the adaptation of activities which promote outdoor recreation for the citizens. In the guidelines for Management, urban farming is mentioned as an opportunity in relevant parts of parks and natural areas which should be created based on the residents interests. However, the document questions how these places can be created. The most in-depth policy document regarding the planning of public green spaces in city districts is the *park plan*. Every city district has a park plan where the values and functions of the parks and green spaces in the city district are described. This plan is also one of the first to describe the strategic challenges in the district and addresses deficiencies and needs that should be included in continued management (Stockholm stad,

2017). Since this research does not focus on a particular city district, the park plans of the districts are not important to analyse.

The policy documents and strategies stress the value of the green spaces in the city and the need for improved, inclusive and multifunctional public green spaces. An important tool that should guide management and exploitation of the places is ecosystem services, which should be accessible to all Stockholmers. The governance of public green spaces is characterised by collaboration between various committees and company boards but should shift towards an even more collaborative governance structure, including different stakeholders and increased citizens participation. Moreover, the need for co-creation and participation through dialogue and increased information is stressed as necessary in issues regarding green spaces.

2.5.3 Regulations for urban agriculture

As mentioned previously, there are currently no general guidelines for urban agriculture practices in Stockholm. However, there are certain regulations which are based on facilitating citizens initiatives by providing land for cultivation (Stockholm stad, 2021). The municipality of Stockholm promotes initiatives for urban gardening when citizens indicate that they want to have a place to grow their own vegetables or fruits. The places are the responsibility of the citizens and the government functions as the provider of the land and in some cases also provides certain equipment. Inhabitants can grow crops in pallet collars for personal use, located in public places, and there is a possibility to apply at the district administration to start an urban farm with a group of people (Stockholm stad, 2021). Citizens should suggest the location and the district administration inspects whether it regards public land and if it is available for cultivation. Some districts also provide tools with pallets for cultivation and biological ground, in other districts the farmers are responsible for this themselves. If citizens want to cultivate on streets and squares, a permit is needed from the police which costs 800 SEK to request (Ibid). Hereafter the police and the government will check if the space is applicable for cultivation. Depending on the size of the cultivation area (> 6m2), the traffic office can provide subsidies, ranging from 15 SEK/m2/year to 30 SEK/m2/year. Considering the costs needed to apply for the permit to cultivate, which could also be declined, the subsidies are very low and not stimulating.

The current practices of urban agriculture in Stokholm are results of citizens initiatives in accordance with the mentioned regulations established by the government. There are no general guidelines from the government on how the practices should be carried out. It can be argued that the regulations, as described above and on the website of Stockholm stad, are in need of change. As mentioned by Stockholm stad, urban farming should be created based on citizen interests. However, the creation of places for cultivation by the government might not be enough. The lack of guidelines and the highly bottom-up character of the initiatives have resulted in various challenges according to volunteers of urban gardening initiatives (Bonow and Normark, 2018). Challenges include unclear expectations of the gardens, vague responsibilities, absence of leadership and limited food production. Furthermore, there are concerns about the privatisation of public land by urban gardening initiatives (Ibid). An increased role of the government in these initiatives can be beneficial. Therefore, when arguing for the implementation of edible perennials in public green spaces by the government, this research puts an emphasis on how increased involvement of the government in food production initiatives can look like.

3. Theory

3.1 Sense of place

Urban green areas play an important role in creating a sense of place (Zeng and Deal, 2023). The places are frequently used by a variety of users and provide various ecosystem services. Due to its multifunctionality, urban agriculture can enhance several ecosystem services, including reduction of greenhouse gas emissions, increase biodiversity, control microclimates, improve social relations and

enhance human health and well-being (Evans et al., 2022). According to the various ecosystem services that urban agriculture can provide, public places which include food production can become popular destinations for citizens. The inclusion of edible perennials in public places can result in ecological literacy (Weiss, 2022, as cited in Spetz, 2022). Ecological literacy encompasses an understanding of how individuals and societies interact with each other and with natural systems (Orr, 1992). By encountering areas with edible and flowering plants, an understanding can be created on how ecosystems are connected (Weis, 2022, as cited in Spetz, 2022). This understanding leads to a strong interaction between ecosystems and human societies and can result in emotional commitment to the place, inducing a sense of place (Zeng and Deal, 2023). Sense of place is a is a multidimensional construct, consisting of (1) the perception concerning the connection between oneself and the environment (2) emotions directed towards the environment and (3) the tendency to choose the environment over other options in terms of behaviour (Jorgensen and Stedman, 2001). A sense of place can create, similar to the sense of belonging, a feeling of responsibility for the place and can result in encouraged public engagement, which is beneficial for public green places.

According to Van Dinter et al. (2022), there is a relation between sense of place and park visits. Whether increased park visits result in a higher sense of place or vice versa is unknown (Ibid). The inclusion of edible perennials in public green places can be beneficial in both cases. According to the ecological literacy that can be accompanied with the inclusion of edible perennials in public spaces, there can be an increasing sense of place established resulting in more park visits. Furthermore, according to the various ecosystem services that urban agriculture provide (Evans et al., 2022), places which include urban agriculture have the potential to be attractive places for the public and can result in frequently visited areas. Therefore, the potential increase in visits to the area can also lead to a higher sense of place and can be an opportunity to include edible perennials in public spaces to make places more attractive. By asking citizens in the questionnaire whether their visits to a public green place would change when it would include food production provides an insight in the potential increase or decrease of visits and hence the sense of place.

3.2 Co-production

The awareness of co-production as one of the collaborative forms in public goods and service delivery has increased due to societal changes. In co-production, citizens can play an active role in delivering public goods and services which are important to them or in which they are directly involved (d'Alençon & Torrent, 2020). In the current construction of public spaces in European cities, co-production is a common practice (Fassi and Galluzzo, 2022). After the pandemic, the participation and involvement of communities has increased and reached a central role in rethinking public spaces in European cities, including Milan, Barcelona and Paris (Ibid). Co-production of public space entails the share of rights, costs and responsibilities of the space among different stakeholders, including the market, civil society and individual citizens (Van Melik & Van der Krabben, 2016) and is beneficial for both the government and citizens (Lee & Scholten, 2024). It can ease the financial burden for the government and can ensure more efficient and effective public services, and can also add value for everyone since it can enhance citizen's openness, trust, communication and inclusion (Ibid).

In defining public spaces, ownership, management, accessibility and inclusiveness play an important role (Lee & Scholten, 2024). To ensure inclusive public spaces, co-production through the interaction of diverse interests is essential (Murphy et al., 2023). The overarching goal of Stockholm to make parks and nature of high ecological and recreational value accessible for all Stockholmers (Stockholm stad, 2017), emphasises the importance of ensuring inclusive public spaces. Since the interaction of diverse interest is essential to create inclusive public spaces (Murphy et al., 2023), multi-stakeholder involvement is needed in the process. However, with the involvement of different stakeholders, challenges can also be accompanied. As participatory processes involve a complexity of actors, contexts and actions, complications on how to govern can occur (Fassi and Galluzzo, 2022). Another

issue that can occur with co-production is distrust (Ibid). Distrust can arise when a certain part of the population is not familiar with the process and therefore does not trust people who work for the 'common good'.

Urban gardening is regarded as co-production of public space since one of the promises of urban gardening is to allow citizens to shape and engage with the built environment (Murphy et al., 2023). Direct involvement of citizens in place creation is necessary for the inclusiveness of public spaces, but can also lead to exclusion of various types. To realize inclusive urban gardening, co-creation is needed with gradual involvement of public authorities (Ibid). This need for involvement of public authorities is also seen in current challenges in urban gardening practices in Stockholm, where the initiatives currently face a lack of clear guidelines, unclear expectations of the outcomes and vague responsibilities (Bonow and Normark, 2018). How the co-production in public spaces should look like depends mostly on citizens interests and the perspective of the government, since it can be argued that in public spaces these are the most important actors. Citizens as users of the space and the government as developers, planners, maintainers and operators of the places. To what extent citizens should be involved in the development, planning and management process of public spaces is debatable. However, to ensure frequently used public space, close dialogue with the users is important.

The importance of co-creation and citizens involvement in urban green spaces is stated by Stockholm municipality (Stockholm stad, 2017). Since urban gardening is regarded as co-production of public space (murphy et al., 2023), the inclusion of edible perennials in public places might also be an opportunity for increased co-production of the places. According to the increasing citizen interest in urban gardening initiatives (Bonow et al., 2020) and the increased interest in local developments, areas, use and production (Randrup et al., 2017), a high potential of citizens involvement in food production in public places can be motivated. The results of the survey, where the support for implementing edible perennials is measured and accordingly the willingness to participate, can be valuable inputs for the discussion. As mentioned previously, co-production can also lead to challenges according to distrust and governance issues. Hence, to understand to what extend co-production is preferred in urban green spaces management in Stockholm and to understand how the inclusion of edible perennials can contribute to this, co-production and citizen involvement are important factors that are addressed in the interviews.

3.3 Citizens trust

Citizen participation is often perceived as creating citizens trust in urban planning by including them in the process. However, participation in itself does not cultivate trust and is often referred to as creating weaknesses in delivering the anticipated results (Åström, 2020). For participatory urban planning to work properly, trust can be rather seen as a prerequisite, both from the citizens perspective as the government. Although citizen's trust in the government in urban planning has been researched frequently, the trust of public officials in citizens is a less known subject (Ibid). The attitude of the governmental representatives in the participation process is often dependent on the success of it, since they can decide what extent the citizens are involved and the opinions are valued (Liao and Schachter, 2017). Although public participation emphasises that the opinions of the citizens are being considered, to what extent they are being incorporated and what is done when the outcomes of the participation process are negative often remains vague (Åström, 2020).

In Sweden, according to the research of Holmberg (2018), only four out of ten citizens are satisfied with the way urban planning is executed. To argue for justified city planning, urban planning needs to be in line with the public interest (Åström, 2020). This seems to be not the case in the current urban planning processes in Sweden, where there seems to be a dispersion between the public interest that the planner considers and the 'real' interests among citizens. Enhanced citizen dialogue and involvement can be beneficial. As mentioned, the attitude of the governmental representatives which is

influenced by the trust in citizens is crucial in this. Therefore, as citizen interest in growing food and the benefits of co-production of public spaces can be drivers for the inclusion of edible perennials in public green spaces, trust from the government in citizens is crucial for increased citizen involvement in public green space management. When this trust is insufficient, the opportunities of co-production and citizen involvement are restricted. Furthermore, trust issues can also be a challenge for the implementation of edible perennials by the government. Edible perennials include vulnerable plants which acquire a careful approach. When the government does not trust citizens to harvest the food and take care of the perennials properly, this can be a constraint for the government to include edible perennials in public spaces. Discussing food production in public places can therefore also provide an insight in the extent to which the government trust citizens and hence the success of citizen involvement.

4. Methodology

This research is based on qualitative research methods. In this study, two different methods have been used. To gain an understanding of how food production in public places is perceived by citizens in Stockholm municipality, an online survey was carried out. Online surveys have the potential to efficiently collect large amounts of data within a relatively short time frame (Regmi et al., 2016). Since a large sample size is preferred in research to enhance the quality and reliability of the results, and the short time frame for this study, this method was chosen. Survey research can result in coverage, sampling, measurement and nonresponse errors (Ponto, 2015). To decrease nonresponse and measurement error, the survey consisted of 5 short questions which were tested beforehand by volunteers and perceived as clear and easy understandable. Furthermore, to limit the coverage and sampling error by not representing the whole target group, the questions in the questionnaire were asked in English as well as in Swedish. Moreover, the questionnaire was posted on different platforms. The message that was attached to the questionnaire can be found in *Appendix 1* and included a Swedish and English description. One of the platforms was Facebook, were the questionnaire was posted in groups of the city districts in the municipality of Stockholm (e.g. 'Farsta', 'Kungshomen', Södermalm och Gamla stan, Stockholm) and groups regarding information in Stockholm which had many members (e.g. 'What's happening in Stockholm city', 'Stockholm Sweden'). Furthermore, the questionnaire was also published on the Linked-in page 'Cities at KTH', which addresses societal challenges of the current time through sustainable urban development in the future and were interested in the subject. The questionnaire was made using SurveyMonkey which was also used for the analysation of the results.

The questionnaire was answered by 118 respondents. However, since the survey was meant for inhabitants of Stockholm municipality, the first question functioned as a control question, asking respondents whether they lived in Stockholm municipality. Only the respondents who answered the question with 'yes' were considered in the analysis to decrease the sampling error, reducing the sample size to 113. The questionnaire can be found in *Appendix 2 (Swedish)* and *Appendix 3 (English).* The questionnaire was carried out to understand the opinions of citizens in Stockholm towards the inclusion of food production, as edible perennials, in public green places in the city, aiming to answer the first research question. The questionnaire also provided supplementing information regarding the willingness to participate in such initiatives to stress the possibility of co-production of public spaces. Furthermore, a question regarding the visits to the places was included to argue for a possible change in the sense of place and belonging. The results of the survey provided, besides answering the first research question, opportunities for the inclusion of edible perennials in public green spaces and therefore contributed to the answer of the main research question. According to the results of the survey, which illustrate a very positive view towards the inclusion of edible perennials in public green

spaces, there is a possibility of coverage error. Since the respondents of the online survey were gathered voluntarily, the people who took the effort to answer the questionnaire could also be the ones who are interested in the subject and hence promote it. Therefore, the population that has been included in the sample for the survey might not represent the general population in Stockholm municipality, which was intended to be studied. This possible error is considered in the discussion of the results, however, since it is unsure whether this is the case and since there is always a possibility of the occurrence of errors in research, the results remain valuable assets for this study.

The other method used in this study are semi-structured interviews. These interviews were used to answer the second research question, aiming to understand the governmental perspective towards food production in public green spaces and the perceived opportunities and challenges. Together with the results of the survey, the interviews were used to answer the main research questions. The respondents for the interviews were gathered by emailing the different district administrations and planning departments. Through email correspondence, the first information was gathered which has been incorporated in the discussion. In this study, four interviews were conducted. Two interviews were carried out with park engineers from different district administrations responsible for i.a. the care, maintenance and cleaning of the parks and green spaces in their city district and part of the local government (Stockholm stad, 2023a). Furthermore, an interview has been carried out with a landscape architect working at the municipality of Stockholm in the development office (exploaterings kontoret) and with a landscape architect working at the municipality of Stockholm in the traffic administration (traffic kontoret) and involved in a project to enhance the regulations for urban agriculture in Stockholm. In Stockholm, the local districts (stadsdelsnämnderna) are responsible for the development of the parks. Whereas the design and large investments of parks is done by the development office (exploaterings kontoret) and the traffic administration (traffic kontoret). Since the interviewees are working in different areas and responsible for different phases in the planning and maintenance of public green spaces in Stockholm, the interviews lead to the discussion of different opportunities and challenges towards the inclusion of edible perennials in public green spaces in the city and hence a more holistic perspective. Besides the interviews, every district administration has been contacted to gather as much information as possible regarding the current regulations of urban agriculture practices in Stockholm. This was seen as necessary to understand where the city is now, to argue for the possible implementations for the future. Existing policy documents were reviewed to strengthen this. The interview guides for these interviews can be found in *Appendix 4.*

Thematic analysis was employed for analysing the qualitative data obtained from the interviews. The interviews were recorded and transcribed. The audio was transcribed manually to prevent the interview from falling into the hands of third parties. The transcripts were coded and categorised into themes and subthemes, allowing for the identification of certain patterns and insights. For the data coding and analysis, the software program NVIVO 14 was used. In this study, the inductive thematic analysis approach was used. This implies that there was no theoretical framework constructed prior to the coding (Mihas, 2023). This ‘open coding’ is beneficial for the interpretation of the language used in the interviews and for the aim of the research (Ibid). Since the interviews aimed to discuss the opportunities and challenges of the inclusion of edible perennials in public spaces, the topics ‘Challenges of urban agriculture’ and ‘Opportunities of urban agriculture’ were formed beforehand. During the review of the data from the interviews, important information was coded and grouped into themes.

The main themes were ‘Challenges of urban agriculture’, ‘Examples’, ‘Opportunities of urban agriculture’, ‘Organisation’ and ‘Participation’. The theme ‘Organisation’ was subdivided into sub themes including the different governance bodies, namely the ‘District administration’, ‘Development office’ and ‘Traffic administration’. The ‘Traffic administration’ included another sub theme, namely ‘Guidelines of urban agriculture’. Since one of the interviewees was involved in a project regarding

the enhancement of the current guidelines and policies of urban agriculture practices in Stockholm the interview included many links to the current guidelines as well as the future changes. The theme 'Examples' included 2 sub themes as well, namely 'Planning public green spaces' and 'Urban agriculture initiatives'. This division was needed to create a distinction between examples of general planning of public green spaces and more in depth urban agriculture practices. An overview of the themes can be seen in Table 1. The files indicate the amount of interviews in which the theme is coded and the references indicate the amount of codes. As seen in the Table, the themes 'Challenges of urban agriculture' and 'Opportunities of urban agriculture' were the most frequently used codes.

Name	*Files*	*References*
Challenges urban agriculture	4	34
Examples	1	2
Examples: Planning public green spaces	2	5
Examples: Urban agriculture initiatives	2	16
Opportunities urban agriculture	4	31
Organisation	0	0
Organisation: Exploateringskontoret	3	7
Organisation: Stadsdelsförvaltningen	3	23
Organisation: Traffikkontoret	1	7
Organisation: Traffikkontoret: Guidelines of urban agriculture	1	15
Participation	3	8

Table 1. Codes used for the analysation of the data from the interviews, made by author

In the final stage of this study, it was possible to get in touch with, and interview, an expert in the field who is working in some of the experimental projects regarding the integration of edible perennials in public spaces across Sweden. Since this interview was carried out in the end of this study, the interview has not been included in the thematic analysis. This interview was rather used to compliment the research by understanding how practices can look like in real life and to argue to what extent the concerns and opportunities discussed in this study are linked to existing practices, strengthening the feasibility of the inclusion of edible perennials in public green spaces in Stockholm. The results of this interview is discussed in the end of the discussion chapter (see *6.1.11 Lessons from existing projects)*. The guiding questions for this interview can be found in *Appendix 5*

In conducting this study, ethical principles were considered. The respondents of the survey as well as the participants in the interviews were voluntary collected. Furthermore, the participants had the right to withdraw at any time during the interview when they felt uncomfortable. Since the questionnaire aimed to understand citizens perceptions, no personal data was needed and therefore questions regarding personal data were not being asked. Before conducting the interviews, the interviewees were asked whether they consent the recording of the interviews and pseudonymity was granted since no names were used and the specific district administrations where they worked were not mentioned. Furthermore, the interviewees were given the possibility to read the research before publication, to ensure that the data was correct and has correctly been interpreted. All the interviewees wanted to make use of this opportunity. Therefore, the draft version was sent to the interviewees to provide them with the opportunity to read the thesis and suggest changes which would be incorporated before publication. However, since no suggestions of change were communicated back, the data and interpretation were regarded as correct.

5. Survey

To have an indication of how citizens in Stockholm view food production in public green spaces in the city, an online questionnaire has been carried out among citizens of Stockholm municipality. In the questionnaire, it has clearly been stated that food production is viewed as the inclusion of edible perennials for the public to harvest. In the following paragraphs, the results of the questionnaire are given and discussed.

5.1 Results

The results of the questionnaire are shown in figures below. The figures include the English questions, however in the questionnaire the questions were also translated to Swedish. The first question was whether you live in Stockholm municipality. Since the respondents who don't live in Stockholm have been removed from the analysis, the answer to this question was 100% yes.

Question 2: How do you value local food production?

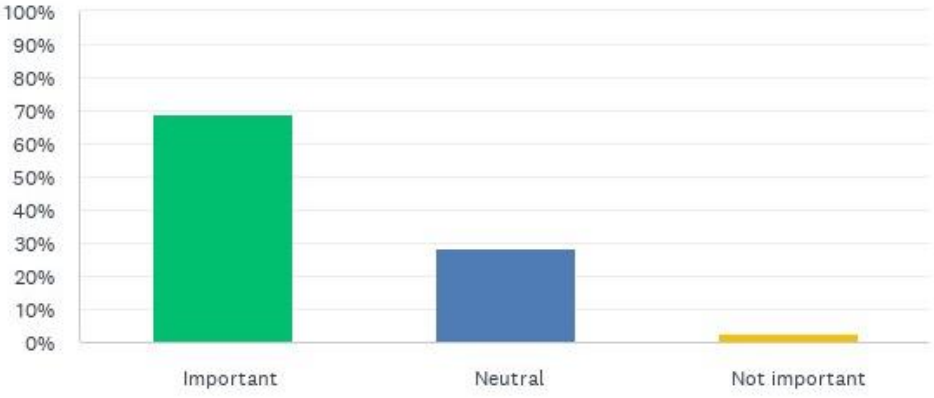

Figure 1. Results question 2, automatically constructed by SurveyMonkey

Answer choices	*Responses (%)*	*Responses (n)*
Important	69.03 %	78
Neutral	28.32 %	32
Not important	2.65 %	3
Total	100 %	113

Table 2. Overview results question 2, made by author

Question 2 was aimed to provide an insight in how inhabitants of Stockholm view local food production. Since local food production is the foundation of urban agriculture initiatives, the way people value local food production can be directly linked to their view towards urban agriculture. As seen in Figure 1 and Table 2, 69% of the respondents value local food production is important, 28% have no opinion towards local food production and 3% value local food production as not important.

Question 3: Would you support food production in public green spaces in Stockholm?

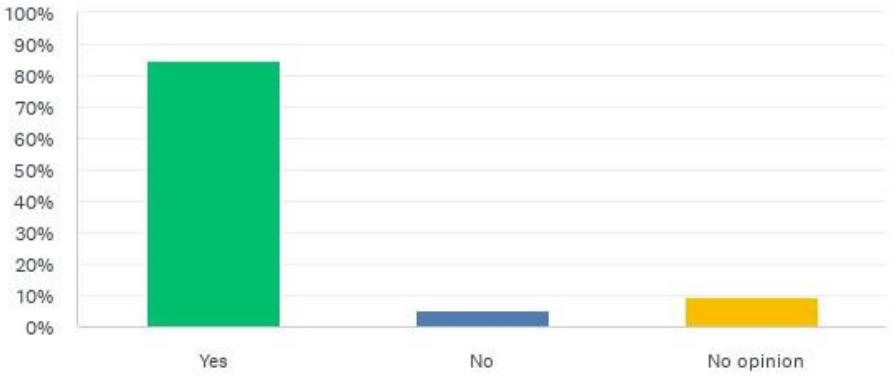

Figure 2. Results question 3, automatically constructed by SurveyMonkey

Answer choices	*Responses (%)*	*Responses (n)*
Yes	84.96 %	96
No	5.31 %	6
No opinion	9.73 %	11
Total	100 %	113

Table 3. Overview results question 3, made by author

Question 3 is the most important question from the questionnaire. The main purpose of the survey was to understand whether citizens of Stockholm would support food production, in the form of edible perennials, in the public spaces in the city. As seen in Figure 2 and Table 3, 85% would support this, whereas only 5% would not and 10% has no opinion towards this.

Question 4: Would you visit public green spaces more often if they would produce food?

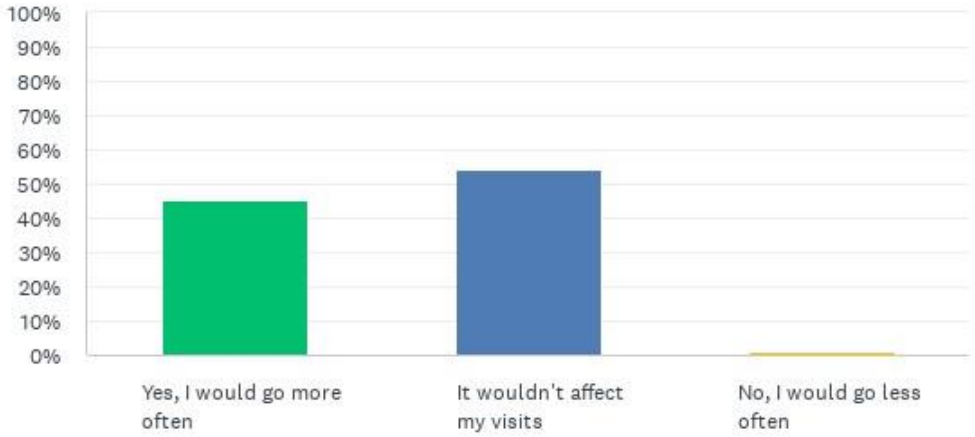

Figure 3. Results question 4, automatically constructed by SurveyMonkey

Answer choices	*Responses (%)*	*Responses (n)*
Yes, I would go more often	45.13 %	51
It wouldn't affect my visits	53.98 %	61
No, I would go less often	0.88 %	1
Total	100 %	113

Table 4. Overview results question 4, made by author

Question 4 aimed to indicate how visits are affected by the inclusion of food production in public green spaces. As seen in Figure 3 and Table 4, 45% of the respondents would visit the public space more often when edible perennials are included. 54% of the respondents mention that the inclusion of food production doesn't affect their visits and only 1% would go less often.

Question 5: Would you participate in initiatives to produce food in public green spaces?

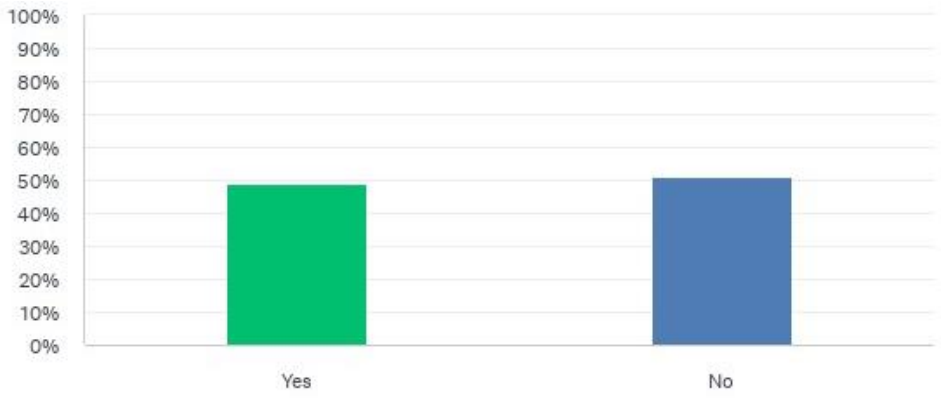

Figure 4. Results question 5, automatically constructed by SurveyMonkey

Answer choices	*Responses (%)*	*Responses (n)*
Yes	49.11 %	55
No	50.89 %	57
Total	100 %	112

Table 5. Overview results question 5, made by author

The last question of the questionnaire provides an insight into the willingness of citizens to participate in initiatives to produce food in public spaces. 1 respondent skipped this question, resulting in 112 respondents in total. As seen in Figure 4 and Table 5, 49% of the respondents want to participate, whereas 51% doesn't want to participate.

5. 2 Discussion

The questionnaire aimed to provide an insight in the perspective of citizens of Stockholm towards food production in public green spaces. In the planning and maintenance of public green spaces of Stockholm, there is an aim to include the opinions of citizens in developing public spaces (see *2.5.2 Planning policies and strategies*). Furthermore, urban farming is mentioned as an opportunity in relevant parts of parks and natural areas based on citizens interests. When arguing for increased food production in public green spaces, indicating the interests of inhabitants can be very useful. Moreover, the results of the questionnaire can be valuable when discussing public spaces as co-production of citizens and planners practices. The 1st question entails a control question to ensure that only residents in Stockholm are considered in the analysis, this was the case for 113 respondents.

The 2nd question indicates how local food production is valued. This question was included to introduce the topic and to understand to what extend people think about the origin of their food and if they are aware of it. As seen in Figure 1 and respectively Table 2, 69% of the respondents think local food production is important, 28% don't have an opinion about it and only 3% think it is not important. This high majority indicate that there is a high awareness among the citizens about the origin of their food and hence could imply that they also have a positive view towards urban agriculture.

The 3rd question is the most important question of the questionnaire, since this indicates the possible support for food production in public green spaces in the city. Visible in Figure 2 and respectively Table 3, it shows that 85% would support this, whereas only 5% would not and 10% has no opinion towards this. These results are very positive when arguing for the implementation of food production in public spaces. Noticeable is that some citizens who didn't value local food production as important still would support food production in public green spaces. Regarding the way citizens opinions are valued in the planning processes of public spaces in the city, this high amount of support can be a valuable argument for the discussion of including food production in public spaces. The high interest of the citizens can lead to active citizens involvement, resulting in co-production of the places. As previously discussed, co-production is a valuable tool in creating public spaces and is needed to realize inclusiveness (Murphy et al., 2023). Furthermore, co-production benefits the government by sharing the rights, costs and responsibilities with active citizens (Van Melik & Van der Krabben, 2016). Hence, the support of citizens towards the inclusion of edible perennials in public green spaces in the city can be an important argument for the politicians to consider food production as a function of public spaces. Another argument that arrives from the high support and can strengthen the implementation of food production in public green spaces, is that citizens should have the freedom to make and remake their cities themselves (Harvey, 2008). This thought builds on the 'right to the city' as framed by Lefebvre and is one of the most frequently quoted statement in urban planning literature and can be seen as one of the principles of just urban planning.

The 4th question indicates how visits are affected when public spaces include food production. As seen in Figure 3 and respectively Table 4, 45% of the respondents would visit the public space more often when edible perennials are included. 54% of the respondents mention that this doesn't affect their visits and only 1% would go less often. As previously mentioned, a relationship between sense of place and park visits can be distinguished (Van Dinter et al., 2022). In this case, the increase of visits results in an increased sense of place in the areas. An increased sense of place implies a deeper emotional commitment of citizens towards public spaces (Zeng and Deal, 2023). This connection can be beneficial for the way citizens care for the places and hence use it. Since, as will be argued more in-depth in the next chapter, the possible implementation of urban agriculture in public spaces is based on trust in citizens, this increased sense of place can be an important argument. Citizens who are more

engaged with the public space they use, are more likely to take responsibility for the place and care for it and can therefore lead to increased trust by the government.

The 5th question aims to go deeper into the support of food production in public spaces by looking into the willingness to participate in these initiatives. Since active citizen participation in urban agriculture practices is needed to be established according to the current guidelines in Stockholm, this question is valuable to argue for the feasibility of food production in public spaces. As seen in Figure 4 and respectively Table 5, 49% of the respondents want to participate, whereas 51% doesn't want to participate in such initiatives. This high amount of participants strengthens the opportunities for food production in public green spaces and affirms the claims for co-production in the discussion in question 3.

6. Interviews

Interviews with different governmental bodies have been conducted to answer the second research question by comprehending what the challenges and opportunities are and can be when arguing for food production in public spaces through the inclusion of edible perennials. Certain district administrations are already working with the inclusion of fruit trees or gardening initiatives in their public green spaces, either in a very small scale or in secluded areas. Understanding the challenges and opportunities that are accompanied with this strengthens the discussion for enhanced food production in the future. In the following paragraphs, the challenges are discussed as identified in the interviews. Hereafter, the opportunities are examined.

To provide more insight in the feasibility of the inclusion of edible perennials in public green spaces in Stockholm and argue to what extent the challenges and opportunities as discussed in the interviews with the government are related to real life practices, the discussion is complimented by including the perspective of an expert, who is working in projects regarding the implementation of edible perennials in public spaces across Sweden. The projects include the implementation of a city forest in Västerås and an edible play environment in Örebro, which have been mentioned in the introduction of this study. In paragraph *6.1.11 Lessons from existing projects*, the challenges and opportunities as discussed in this research are being reviewed with the knowledge obtained by the expert through working on the projects. Furthermore, other challenges and opportunities that occurred in the projects are mentioned as well as the expert's view on the inclusion of edible perennials in public green spaces in Stockholm.

6.1 Discussion

Challenges of food production in public green spaces

6.1.1 Privatization of public land and challenges of public food production

When discussing food production in public green spaces, one of the identified challenges were concerns regarding the privatization of public land. Since public spaces need to be accessible for everyone and urban gardening practices can result in secluded areas, there is a concern that the inclusion of edible perennials in public places will result in reduced accessibility of public places. As public green space is limited and often include valuable assets, privatization of the land should not be the case since this can lead to conflicts between citizens. The emphasis from the government on ensuring publicity of the spaces and prevent privatization can be seen in the following quote:

"the green spaces in Stockholm, and probably in all bigger European cities, are getting smaller and the populations are growing. So the need for the public spaces, especially where I am working, in the

inner cities, it's debated. If someone is trying to make a space private, people get very upset and that is not our assignment" (interview with development office)

This quote indicates the task of the government to ensure public spaces where everyone is welcome and all inhabitants can benefit from the existing ecosystem services. Therefore, when including food production in public green spaces, publicity should be maintained. Furthermore, as Stockholm offers allotment gardens where citizens can grow food for themselves, food production in public spaces should be open accessible for everyone. This can be seen in the following quote:

"…if you want to do something just for yourself you need to get an allotment or something more private, or do it in the backyard. If it is in a public space, it should be for the public, so you are not allowed to just have it for yourself" (interview with traffic office)

In existing urban gardening initiatives in the city, which are managed by citizen volunteers, accessibility is therefore an important aspect that the government considers. This accessibility means that the places are free accessible for visitors and indicate that everyone who wants to participate in the initiative has the possibility. However, since there is no governmental control on this matter, it is hard to say whether this is the case in real life. Open accessible places where food grows raises also another question, namely who should be the receiver of the fruits and vegetables that are produced. In the current organisation of urban gardening initiatives, citizens who take care of the gardens are most of the time the ones who are in charge of the harvest and can decide who gets the vegetables and fruits. However, when arguing for the implementation of food production by including edible perennials in public spaces to enhance food security, everybody should be allowed to harvest. According to the interviews, this can lead to several challenges when people are not aware of the practices. Therefore, when the food production is included in public spaces and intended for everyone, it is important to clearly communicate where and when it is allowed to pick the fruits and vegetables:

"*… it needs to be in an area that is quite clear that this is this area where you can pick fruits, because we can also see that not all people know how to. If we say it is oke to pick flowers everywhere, they start picking tulips and we don't want that. We can see a risk, definitely, we have to be very specific where…" (interview with traffic office)*

Especially regarding edible flowers, it could be tricky for citizens to comprehend which flowers and where it is allowed to pick them. Citizens are often not experts in gardening and lack understanding on how and when to harvest which can lead to damage of the plants and accordingly the ecosystems. To help guide citizens in where it is allowed to pick fruits, Stockholm stad has considered including fruit maps in park plans. These maps show where fruit trees are located to make it known to the citizens where they can pick the fruits. This idea however, turned out to be rather complex and raised other concerns.

"… the problem with maps like that could be that someone just want to have lots of apples for selling. So if we make a map, they can see oh this is a good place where we can go and take everything…" *(interview with traffic office)*

However, not having people to pick the fruits is also undesirable. Rotten fruit on the ground attract birds and other animals and is not contributing to a goodlooking public space. This is mainly a problem in areas where there are no apartments in close proximity, since the fruits are less likely to be picked. This dilemma of on the one hand, people picking everything and on the other hand not having people to pick the fruits, is important to consider when arguing for cultivation in public places. The open accessibility of the places where food is produced can result in misutilization of the food production. Moreover, knowledge of how and when fruits should be harvested is necessary to prevent damage of the trees. The concept of food production in public spaces is based on trust in citizens to understand the value of the spaces and comprehend the difference between using it and misusing it. As

seen in the results of the survey, food production in public places can increase the sense of place. This can benefit the way citizens care for the place and use it which can gain governmental trust in citizens to use the places properly. Trial and error of different practices is needed to discover the patterns of citizens behaviour and understand what works in the context of Stockholm.

A strength of implementing urban agriculture is re-using unutilized spaces in cities (Unity Environmental University, 2024). However, when discussing food production in public green spaces in Stockholm, the opposite is the case. The spaces are frequently enjoyed by citizens and include various ecosystem services. Hence, it is of great importance to keep the spaces open for all inhabitants. The ecosystem services should namely be perceived as urban commons, enjoyable for everyone. This is also emphasised by Stockholm municipality by mentioning the importance of inclusive public spaces in policies for urban green space planning. Moreover, the high urbanisation rate in Stockholm and the population rise increasingly pressure public green spaces. Therefore, when discussing food production in these spaces, publicity is an important aspect to consider. According to the mentioned concerns about privatisation of public land through urban gardening initiatives in the interviews, which have also been indicated by Bonow and Normark (2018), this can be challenging. Since in the current organisation of urban gardening initiatives, the citizens volunteers are responsible and in charge of the harvest, it is only understandable that full publicity is not wanted since it can endanger the carefully planted and maintained edible plants. When discussing the inclusion of edible perennials in public spaces as a means to produce food for all inhabitants, the places should be open accessible. This publicity can be granted through increased involvement of the government. However, the success of this open access is based on the citizens behaviour towards it. Therefore, trust in citizens to behave accordingly can be seen as a prerequisite for the implementation of edible perennials in public spaces by the government. This trust can be enhanced through education and clear communication towards citizens on how to access the places and when and how to harvest.

6.1.2 High responsibility for the government

Local food production is a subject which is being discussed in several departments in Stockholm. Ongoing projects show that the interest in growing food in the city is acknowledged by the government as well as the citizens. When arguing for human food production, one of the stressed concern from the governmental perspective is the quality of the food. If the government is the facilitator of the food production, the responsibility of the quality of the food is also for the government. Human food production is accompanied by many regulations to ensure good quality. This has been indicated in one of the interviews:

“….there are so many unknown things and obstacles. And considering humans, there are a lot of regulations. I don't know all of it, if we have human food production, the city would have to follow a lot of regulations for that…. “ (Interview with development office)

The responsibility that the city needs to take when providing human food production is significant. As the ground in cities can be contaminated, the ground needs to be tested frequently. Due to the open accessibility when producing food in public spaces, the government sees a threat in the possibility of someone poisoning the food. The quality of the fruits and vegetables needs to be tested to ensure that there are no health risks when consuming them. According to the Swedish Food Agency, it is always the responsibility for the producer or importer and seller of the food that the products are safe for the consumer (Livsmedelsverket, 2021). When the government will be the producer by implementing and maintaining edible perennials in public green spaces, and in this case there is no seller since the food is directly available to the citizens, it is the government who has to ensure that the food is of good quality. In existing urban gardening initiatives, the responsibility is shared between the government and a group of volunteers or in the case of allotment gardens, with private citizens. Since the government allocates public land to urban gardening initiatives, the government still needs to test the

ground to ensure there is no contamination and that it is safe for cultivation. As food production is currently not viewed as one of the tasks of the city, the city doesn't want to take full responsibility for it. However, interviewees suggest that this perspective could change if private parties or organisations are willing to take part of the responsibility:

"If the city is also going to maintain it, then you need to have an organisation that is going to test the products and sell it, and that is not on the cities' list of things to do. But if there is a company or organisation, private society, that wants to do this, the city would probably want to do it on a smaller scale" (Interview with development office)

As indicated in this quote, shared responsibilities between the government and different actors could result in the city being more willing to consider food production on a small scale. The involvement of different stakeholders and the accompanied share of responsibilities results in co-production of the spaces, which is favourable for public spaces (Murphy et al., 2023). Furthermore, besides responsibility, costs can also be shared which can decrease the barrier for local governments to implement food production further. However, as mentioned in the quote, when a private company or organisation is involved which is not funded by the government, there has to be a certain gain for them which can be reached by selling the products. When arguing for food production in public spaces freely available for citizens, the products should be free and therefore gains has to be made elsewhere which can be challenging. As discussed in the interviews, ethical considerations when arguing for food production include the threat of food poisoning. This statement indicates a certain distrust in citizens which doesn't benefit the discussion of including edible perennials in public spaces, since as argued previously, trust in citizens can be seen as necessary for the implementation. Furthermore, this indication of distrust is also unfavourable when arguing for citizens participation in these initiatives, since this is based on mutual trust (Åström, 2020) and the attitude of governmental representatives in participation processes is often dependent on the success of it (Liao and Schachter, 2017).

6.1.3 Increased maintenance

An important aspect when considering incorporating edible perennials in public spaces which has been emphasised in several interviews, is the increased maintenance that is needed. In Stockholm, most public green spaces are maintained by the districts administration in the city district in which they are located. Maintenance duties include cutting grass, picking weeds and looking after playgrounds and trees. Furthermore, when the city district contains nature reserves, the duties include taking care of shrubs and trees to ensure the resilience of the areas, benefitting both recreational purposes and the species living there. Some of the bigger parks, including large park investments are under the responsibility of the traffic office. However, this is always done in close collaboration with the city districts, since they are aware of what fits best in the area due to frequent dialogue with citizens. In the city districts, park engineers are looking after the maintenance of public spaces. Currently, the maintenance duties are conducted by companies hired by the district administrations. However, due to political decisions, the maintenance of public spaces will be taken back to the organisation in the district administrations. Hagersten-Älvsjo and Järva are among the first city districts to start with this. This transition provides opportunities for more cost-efficient maintenance according to the district administrations, which is illustrated in the following quote from one of the interviews:

"It provides possibilities, for stadsdelsvervaltningen, to regulate were we put our energy and most work into. Because now it is regulated by this contracts and we can't step aside from that contract" (Interview with park engineer)

As indicated in the quote, the companies that are hired to do the maintenance, work on a contract basis for the district administrations. This can be unfavourable for the district administrations, since the companies need to get paid regularly, even when certain maintenance might not be required anymore due to certain weather conditions. According to the district administrations, one of the most important

aspect that is considered for the maintenance of public spaces and greenery is the budget. This strict budget results in time and cost efficient maintenance of the green spaces in the district. All public spaces should have maintenance and therefore time and money needs to be properly divided between the spaces. There is no room for big projects which require more than the regular maintenance. Since it takes several years to make sure that a certain area is maintained, long term maintenance is also something that needs to be considered which can be a challenge. The areas which are perceived as dangerous for people, e.g. holes in the ground, falling trees, have the priority and this is also where most of the budget goes to. When arguing for the inclusion of edible perennials in public green spaces, the budget is therefore also seen as one of the main constraints when it comes to maintaining the perennials. Furthermore, when the government should be in charge of the maintenance of the perennials, the current organisation in district administrations regarding the maintenance of public green spaces needs to change. Districts will need to hire educated people who have knowledge about gardening, since this is usually not part of the current organisation of the city districts:

"Because what comes with apple trees, for instance, or fruit trees, is that you need to be quite good at taking care of them, a particular way of giving them extra fertilizer etc. So it is still quite a high maintenance for apple trees and the district administrations usually don't have that extra in their maintenance team" (Interview with development office)

However, in some city district where fruit trees are already located, the district administrations are aware of the increased maintenance. These places where fruit trees grow have either existed for a long time or are newly constructed. An example of a historical place where fruit trees have been growing for a long time is Kristinebergs Slott, located in Kungsholmen. In the area, the old apple orchard is renovated and there are many apple trees where people are welcome to pick the fruits. These historical fruit trees are mostly located next to large houses where the more wealthy people live or next to public buildings such as schools. The maintenance of fruit trees, when located in public spaces, is in these district administrations included in the maintenance team:

"….. we have arborists that do the trimming, we don't want anyone to do that, but it's free for everyone to pick the fruits, but not touch the branches…." (interview with traffic office)

Besides the historical places, several parks in Stockholm are experimenting with the inclusion of fruit trees. The places where fruit trees are being implemented are carefully chosen. The development office tries to avoid planting fruit trees, or trees that are letting things go and fall on the ground, in areas without apartments or in streets or squares. Since in places without apartments the fruit is less likely to be picked, resulting in extra maintenance, and in streets or squares extra maintenance can occur when fruit is not being picked and falls on the ground and colours benches or paving. The government considering experimentation with fruit trees indicates the interest from the government in food production in public spaces and that the maintenance of fruit trees can be included in the maintenance duties of district administrations, which can be seen as an opportunity for increased food production in public spaces in the future. However, as indicated, to limit the extra maintenance, the trees need to be located carefully. Furthermore, to ensure proper harvesting, awareness needs to be created among citizens which can be challenging since clear communication on where it is allowed to harvest can raise other concerns.

6.1.4 The need for engaged district administrations

As discussed, edible perennials need advanced maintenance to ensure good food production which results in extra costs. Therefore, the way and to which extent city districts choose to incorporate food production in public spaces can differ between the districts. Engaged district administrations who work together with active citizens are more likely to support food production in public spaces, since the labour can be shared and costs can be cut. This collaboration and engagement with citizens is

regarded as a requirement for the inclusion of food production in public spaces according to the development office:

"…you need to have a very engaged city districts, who is going to take care of it. You need to have the knowledge, or some kind of organisation or close by gardening society…" (interview with development office)

The organisational structure as described in the quote, relies on citizens who are willing to take part of the responsibility. When districts don't have active citizens who want to participate, this can be a challenge for implementing edible perennials in public spaces by the government. However, it can be argued that this is very unlikely to happen in Stockholm. The level of engagement in urban gardening initiatives show rather opportunities in this aspect. According to a questionnaire carried out by Stockholm stad, approximately 28% of the inhabitants of Stockholm who don't have a place where they can grow vegetables would like to. This emphasises the interest in growing food among citizens. Moreover, as seen in the survey conducted in this research, 51% of the respondents would want to participate in initiatives concerning edible perennials in public spaces. This potential active engagement of citizens in food production in public spaces results in shared responsibilities, labour and costs between citizens and the government and therefore co-production of these places.

The inclusion of citizens in the process of food production in public green spaces is in line with the emphasis of Stockholm stad to include citizens and co-create public green spaces. Collaboration between the government and citizens is viewed by the government as necessary to implement the inclusion of edible perennials in public spaces. However, when arguing for fruit trees, this seems to be easier for the government to implement and doesn't require active engagement for citizens. Therefore, a distinction can be made between fruit trees and other edible perennials.

Opportunities of food production in public green spaces

6.1.5 The multifunctionality of urban agriculture

The multifunctionality of urban agriculture is an important benefit for cities and can be one of the reasons for cities to consider food production (Ackerman et al., 2014). When discussion the inclusion of edible perennials in public spaces in the interviews, contributing benefits besides food production can result in more interest from the city and hence provide opportunities. Stockholm is struggling with social issues, and therefore, the benefit of urban agriculture to increase social sustainability can lead to new interest from politicians. Increased social sustainability is beneficial for the mental health of populations. Therefore, according to the interviews, when considering this perspective, politicians might be willing to consider more places for cultivation due to the complemented health benefits. This is illustrated in the following quote:

"… if politicians say that this is the goal we have. That this is something we think is both healthy, for mental health and physical health. It could also be people's health projects. You need to provide money for the city to prioritise these thing" (interview with development office)

The money that is needed for this prioritization can be achieved due to the increased budget which can be available when public health is discussed. According to the Traffic office, the budget for urban gardening initiatives for this year has been increased according to the contributing benefits:

"In the city council, they say that the interest for growing is increasing and more places for growing things should be arranged in the city and that urban gardening is good for biodiversity and also for social, life quality. That we have this mission to increase urban gardening."(interview with traffic office)

This quote shows that the city council is acknowledging the importance of urban gardening by generating more money to increase urban gardening practices due to the enhanced environmental and social sustainability that are accompanied with urban gardening. The social aspect is acknowledged as an important reason why citizens participate in urban gardening initiatives, with in particular community gardens (Bonow and Normark, 2018). Especially after the pandemic this need for social contacts has grown. Due to the diverse group of people who is interested in gardening, it can help enhance integration between different nationalities and age groups:

"…The social part is really interesting. Because on one hand it can cause a lot of problems, but on the other hand it is good for integration and make different groups work together. It is an interest that crosses from kids up to older people or from different countries. It has really social opportunities, so I see that as a strength…" (interview with district administration)

This aspect can be a valuable reason for the government to support gardening initiatives and consider the inclusion of edible perennials in public spaces with citizens involvement. As mentioned previously, citizen involvement in place creation results in a higher sense of place, indicating a stronger connection between citizens and the environment and a higher emotional attachment towards the place (Jorgensen and Stedman, 2001). This higher sense of place leads to increased awareness of edible perennials among citizens and can lead to increased citizen interest in the practices. Furthermore, awareness among citizens is also beneficial for the trust from the government in the citizens to take care of the perennials properly, which can lead to the city assigning more places for food cultivation.

Citizen interest is urban gardening is also indicated in the analysation of the survey conducted in this research. Although it is unclear what the reason behind the willingness to participate is, the potential high participation rate in the initiatives for food production in public spaces can result in increased social cohesion in public spaces. These social benefits can be achieved when there is citizens involvement in taking care of the perennials, emphasising again the importance of citizens participation. It needs to be stressed that the importance of involvement of citizens in public space development to increase social cohesion is not limited to initiatives that focus on food production. However since this is not part of this study, this will not be discussed more in-depth.

6.1.6 Educational purposes

Another benefit that arises from growing food together which was discussed in the interviews is the educational aspect. Currently, Stockholm municipality is cooperating with kindergartens who want to have a small area for growing for educational purposes:

"…we cooperate with some of the kindergartens, we have now been asked for a space where they can grow some things. So now we will arrange a small area where they can grow stuff and then they have their own responsibility to take care of it, they don't need to produce, it is more of an educational thing. So they can show the kids how to plant something and give it water and make it grow." (interview with district administration)

As cited, the educational purpose of growing food is central for the kindergartens and the production of food is viewed as a desirable side effect. Especially in cities, where it is not so common to see how food is produced, it is important to include food education in the regular education since food is an important factor in the wellbeing and daily life of children (Sandell et al., 2016). A healthy relationship with food is important to establish at an early age to create healthy eating habits later on in life (ibid). Knowledge of sustainable and local food production can play a role in creating these habits.

Letting children grow their own food can be an important tool in food education by creating awareness of the origin of food and making children familiar with different vegetables and fruits.

As discussed in the challenges for open access to edible perennials, education of citizens on how to use the spaces and take care of the perennials plays an important role in arguing for food production in public spaces, since it is indicated as a perquisite to ensure correct practices. When making citizens familiar with edible perennials from a young age in kindergartens, they will gain knowledge on the topic which can be passed on to their parents. Furthermore, this will lead to increased awareness of edible perennials among future generations, which provide new prospects of food production in the city for the future.

6.1.7 Increased food security

Another argument when arguing for cultivation in public spaces in Stockholm is increased food security. Certain circumstances can result in the growing need for food production in cities and public spaces. Inflation, pandemics and wars could cause a quick change in the food supply chain to cities and can encourage the need for local food production. To be prepared for this, it is discussed in the interviews that Stockholm maybe should already have places available for food production:

"… The world has changed so much, just in a few years with the Ukraine war and inflation, that are two kind of big factors that make people interested in growing vegetables and fruit. Maybe the city should be prepared to be able to grow in some parts. If there would be a crisis or a war…" (interview with development office)

As indicated in the quote, circumstances can change rapidly which can result in the need for increased local food production in a relatively short time period. Hence, it would be beneficial for the city to be prepared for this and experiment with food production in different places of the city.

However, according to the current inflation in Sweden, it can be argued that this need for local food production is already there. In the last decades, Sweden has experienced the highest inflation rate which resulted in a 20% increase in food prices (Roy, 2023). This has led to a significant increase in people who need food assistance (ibid). Therefore, it can be argued that there is an existing need for more affordable vegetables and fruits. Furthermore, according to Sweden's low self-sufficiency rate, food security should get more attention in current policies and regulations. According to Ackerman et al. (2014), food production in cities can enhance the quantity and quality of food accessibility to low-income urban households. By including edible landscapes in public spaces, fresh fruits and vegetables become accessible for everyone, which can be especially valuable for people who can't afford it and are in need of food support. However, as discussed in the interviews, this seems to not be in line with the current perspective of the government, where politicians prioritise other topics and pay less attention to ensuring affordable food.

6.1.8 Citizen dialogue in public green space planning

The importance of citizen dialogue in public space planning has been emphasised frequently in this research. This has also been stressed in the interviews with the different governmental bodies involved in public green space management. According to the interviews, there is always a certain dialogue between the district administrations and local citizens when the public spaces are being developed:

"…we always ask the people around the park, so we have this dialogue with people…" (interview with traffic office)

As the needs of citizens can change over time due to the change in society and citizens behaviour, it can be hard for the government to predict what functions are wanted in the specific public spaces.

Therefore, frequent dialogue with citizens is needed to understand their demands. In the development and design of public places in Stockholm, the opinions of local citizens are valuable inputs since they can differ from what the government expect that the citizens want. In previous projects, a distinction has been experienced between how the government thought the public space should be developed and what the citizens actually wanted:

"….once I had this project in Skarpnäck, south of Stockholm, where there was a soil park with just a grass area and some hedges around and the district administrations wanted us to make something more nice and peaceful there. They had a bit of a problem with dog fights.. and then we designed this nice park. When we showed this to people in the park, all the people around the parks said no we don't want this, we want to have a food park instead." (interview with traffic office)

As stated above, the citizen dialogue is very important in public space planning, since it can differentiate between what the government assumes the citizens want and what citizens actually want. There are different ways in which citizens opinions are gathered. Citizens can hand in a written report where they can address recommendations or ask questions. Since this is an official written document, it is something that the local politicians should consider. However, more frequent is a questionnaire to understand how the park should be developed and which functions are preferred. The way in which these opinions are considered in the development and design of public spaces can differ as well. Since the government includes various experts in the planning and development process of public green spaces, there are certain aspects which are considered before the citizen dialogue takes place. One of these aspects is the type of green space, which can be a dominant factor in the determination of the usage and function of the space. Flat ground is for example suitable for grass areas and enables flexible usage for citizens, whereas in nature areas the focus should be on enhancing the ecological values. Therefore programming of the spaces is seen as an essential tool in developing and designing public spaces. When the public space include grass areas, citizens dialogue will be more beneficial since various functions can be realized. However, in nature areas ecological values are being prioritised and therefore citizen dialogue is not so beneficial.

Citizen dialogue has become an increasingly important aspect in urban planning. Communicative planning with the inclusion of citizens in the process is often seen as the ideal in planning research (Soneryd & Lindh, 2019). This is also noticeable when considering the policy documents regarding the planning and design of public green spaces in Stockholm, where the inclusion of the opinions of citizens is highly valued. It can be argued that citizen dialogue is especially important for the planning and design of public spaces since citizens are the users of these places. In the interviews, this importance of citizen dialogue has also been addressed and discussed. Regarding the inclusion of food production in public spaces, the importance of considering the value of the opinions of citizens provide several opportunities. According to the conducted survey, where 85% would support food production through the inclusion of edible perennials in public space, there is a high interest experienced among citizens of Stockholm. Furthermore, there is also a high interest in urban gardening. Hence, when this positive view of citizens towards food production in public spaces is noticed in citizen dialogues, the government will consider most likely more places for food production.

6.1.9 Multiple stakeholder involvement

In the interviews, the importance of multiple stakeholder involvement in implementing food production in public spaces has been mentioned several times. Besides the need to include citizens in the process, other actors can also play an important role. According to the government, local food production in public green spaces can generate interest among local stores and restaurants:

"… I have seen that some cities have cooperations. I don't know if they sell it to restaurants or if it is so locally on a market but you can kind of follow the whole chain from the production until it reaches the consumer, then it is more of a production" (interview with park engineer)

Although this cooperation can result in more food being produced, it will not be favourable for public green spaces in the city. When companies are responsible for the food production, they will not prefer open accessibility of the places and want to keep the harvest for themselves which can result to privatization of public land which is not wanted. Moreover, since private companies need economic advantages, the financial drivers will become dominant which will lead to decreased multifunctionality of the spaces. However, local stores and restaurants could be involved as sponsor of projects where their gain can be part of the harvest. Besides private companies, an opportunity lies in involving public housing companies. Public housing companies own several apartment blocks in the city, which often include semi-public outdoor places. These places are owned by the housing companies and shared between the residents. According to the government, it is easier to turn these places into gardens:

"… if you live in an apartment, which is owned by someone and also has a piece of land they can offer to the people that live in the house. They can put up their own park for growing stuff, and I think that is easier because you don't take up public space, it is still private place.." (interview with district administration)

An important argument for this is that, since the accessibility of the place is already limited to the residents of the apartments, open accessibility does not need to be granted. It should be argued however, that the residents should have a dominant say in developing the area in a place for cultivation and the food should be available for everyone living there. In such alternatives, the inclusion of the local government is limited, since they are often not the owner of the land. These semi-public spaces provide new opportunities but also limitations since certain citizens are restricted from participating and harvesting.

Urban gardening is as example of co-production of public spaces, since it entails according to Murphy et al. (2023) the promise to allow citizens to shape and engage with the built environment. This is also to a certain extent the case in existing urban gardening initiatives in Stockholm. The local government, who is the landowner and needs to approve of the space being used for cultivation, co-creates the space with the volunteers in the initiatives, who shape the garden. However, it can be argued that an increased level of co-production is favourable. Besides citizens, different stakeholders can be included. Which can be, according to Bonow and Normark (2018), part of the solution for current issues in urban gardens in Stockholm regarding unclear responsibilities and lack of leadership. When discussing the implementation of edible perennials in public green spaces, the places should be co-produced by multiple stakeholders according to the government. The government doesn't want to take full responsibility and currently doesn't have the tools for it. Citizen involvement is regarded as necessary in the process and involvement of other stakeholders can be preferred in specific cases but can also result in new challenges.

6.1.10 New guidelines and shift towards collaborative governance

In Stockholm, there are currently no general guidelines on how districts should work with urban agriculture initiatives. As discussed in chapter *2.5.3 Regulations for urban agriculture* this needs to change. The government of Stockholm acknowledged this and started the process of establishing new, general guidelines for urban agriculture. One of the interviewees who works at the traffic office is involved in this process and in the interview, opportunities for food production came forward. The guidelines which are being established will guide the government, in particular district administrations, on how to work with gardening or food production allotments and provide clarity for

citizens. Besides changing the current regulations for urban agriculture practices, the city considers implementing small scale fruit production in public spaces:

"We are thinking maybe we should have some ideas on if it is possible to have a bigger area in every city district or how should we work with it, so actually we work with how it is now and also if we can have orchards, fruit areas… with berries and other fruits, so only fruit trees and shrubs, not the more sensitive perennials" (interview with traffic office)

Regarding the distinction between the maintenance in fruit trees and shrubs compared to other edible perennials, the choice to consider fruit trees and shrubs is logical. This consideration of the city to implement fruit areas in public spaces can be regarded a valuable opportunity, since it emphasises the feasibility of the inclusion of edible perennials in public spaces in Stockholm. Another opportunity becomes visible when discussing the collaborative structure in establishing the new guidelines. According to the city, various actors are involved:

''We are doing it together with development office, the finance office, district administrations and different public housing companies, Stockholm hems, Svenska burostaden and Familje bosstader" (interview with traffic office)

By including various public housing companies besides different levels of government, it can be argued that the organisational structure in establishing the guidelines leans towards a more collaborative form (MacKenzie et al., 2018). The importance of collaborative governance in green space issues has been indicated by Stockholm stad with stressing the importance of co-creation of public spaces and increased public involvement. According to the collaborative structure of the creation of guidelines for urban agriculture and the close collaboration between district administrations and citizens, it can be argued that not only the need for the transition towards a more collaborative governance structure in public green space is recognized, but is already happening. Collaborative governance structures are favourable for nature-based solutions, by increasing their quality (Casprini et al., 2023). Since food production in cities is considered as nature-based solution according to Świąder et al. (2023), the quality of the ecosystem services that the places can achieve can also be enhanced by collaborative governance structures. The shift towards a more collaborative governance structure in Stockholm's public green space planning through the establishment of general guidelines for urban agriculture practices and co-creation of public spaces through citizen involvement, can lead to more places for cultivation according to the citizens support of edible perennials in public green spaces and is beneficial for the quality of the ecosystem services that these places can provide.

6.1.11 Lessons from existing projects

In this paragraph, the previous discussed challenges and opportunities of food production in public green spaces in Stockholm are being reviewed through an experts point of view who worked with several projects regarding the implementation of edible perennials in public spaces. The projects in which the expert was involved were limited to food production from shrubs and trees and did not include vegetables. This was seen as necessary since vegetables require increased maintenance which is hard to incorporate in the organisation of the local government and can hence be linked to the concerns regarding increased maintenance from the government. The distinction between edible perennials regarding vegetables and food production from shrubs or trees has been frequently stressed by the expert and can therefore be seen as an important aspect when discussing the inclusion of food production in public spaces.

The projects in which the expert was hired as consultant were all commissioned by the local government and the maintenance of the perennials was included in the organisation of the local government, emphasising the feasibility of local governments to being able to maintain and implement

edible perennials themselves. When the edible perennials in public spaces consist of nuts, herbs, fruits and flowers, the other challenges indicated by the government, are according to the expert invalid. So does for example, privatization of public land not occur when the current vegetation is being replaced by edible perennials when they do not include vegetables. For cultivating vegetables it is mandatory to have some type of garden due to these perennials being more fragile, which can lead to previous open public spaces being more secluded. However shrubs and trees can be planted almost everywhere and can easily replace existing vegetation which does not include food production and can therefore not lead to privatization of public land. Furthermore, the expert argues that the implementation of fruit trees and shrubs does not, an in fact should rather not, be done with active citizen involvement since this will make the process longer and more costly. However, the citizens opinions should be valued regarding the type of food production that the local citizens prefer. So has the expert experienced that it were especially citizens with a migration background who harvested and suggested the implementation of certain fruits and herbs they were familiar with, like peaches and mint. Therefore, dialogue with local citizens is still desirable.

Regarding the social benefits of urban agriculture as discussed previously, these benefits can still be obtained even though there is no gardening and active citizen involvement in the process. All the projects were very positively perceived by the public and are still frequently visited. Furthermore, experiences from other projects suggested that the places where edible perennials were included resulted in an increase in citizens and turned unpopular places into places with landmarks where people liked to return to. This is an interesting outcome which suggest that the inclusion of edible perennials can also be used as a strategy to make public green places which are currently not so popular turn into vibrant public places. In Stockholm, where values that create a vibrant life are important to consider (Stockholm stad, 2018a), this can provide several opportunities. Furthermore, there are different ways that social interactions can be increased according to the expert, for example through organising harvesting days when the edible perennials are ready to be harvested. As mentioned previously, it was experienced that mostly citizens with a migration background harvested the food that was produced. This provides benefits in neighbourhoods in the suburbs in Stockholm which are currently experiencing social issues and segregation. Incorporating fruit trees and other edible perennials in these areas, can be a valuable asset in increasing social cohesion between citizens.

Another benefit that is accompanied with the inclusion of edible perennials in public spaces is according to the expert the so called ‘ecological literacy’. This has also been indicated by Weiss, one of the colleagues of the expert, who argues that through ecosystem-based food production, an ecological literacy is created and citizens understand the connections between ecosystems when they encounter a landscape with edible and flowering plants (Spetz, 2022). Ecological literacy can increase citizens awareness of the environment and hence lead to a higher sense of place, according to the three elements on which the multidimensional construct is based. Ecological literacy can namely (1) increase the connection between humans and the environment, (2) the emotions directed towards the environment and, as mentioned by the expert, (3) the tendency to choose the environment over others (Jorgensen and Stedman). Sense of place creates a feeling of responsibility of the place and therefore is beneficial for the way citizens take care of the perennials. The concern of the citizens not being able to understand how to harvest the perennials and misuse the places as mentioned by the government, can be easily refuted according to the expert. Including signs that explain how to use the place turned out to be a suitable method. Furthermore, municipal channels could be used to advertise places for cultivation and so can fruit maps. The challenge of certain people picking everything should not be regarded according to the expert, since then simply more edible perennials should be planted. Increased food security as discussed in the interviews with the government, is also an opportunity that the expert sees, especially regarding preparations for crisis situations. In particular nut trees can be beneficial, since nuts are very nutritious and can be valuable when there is a food crisis.

There are also things that needs to be considered when including edible perennials in public places. So is the implementation process of edible perennials a long and costly process. Edible perennials need time to grow before they produce food, especially fruit and nut trees need time to grow. In this period, the places need to be watered regularly which is a costly process and according to the expert, more than half of the budget goes into this. Furthermore, there were concerns experienced in projects considering edible play environments close to kindergartens. Since kindergarten had a no nut policy due to the possibility of children being allergic, concerns were raised when nut trees were supposed to be implemented. After investigating, including nut trees turned out to be not as dangerous as predicted.

7. Conclusion

In this study, the feasibility of the inclusion of edible perennials in public green spaces has been discussed by providing an insight in the citizens perspective towards it and the challenges and opportunities from the governmental perspective. Since public green spaces are frequently enjoyed places in Stockholm, the view of citizens is an important aspect for the discussion. According to the results of the survey, including edible perennials in public spaces has extensive support and the willingness to participate in the initiatives provides several opportunities for citizen contribution. In the interviews, different themes were discussed. As the government views green public spaces as valuable assets for Stockholm, there are various concerns that arise when discussing food production in these places.

As described in the policies presented in the literature review of this study, the government should ensure that all Stockholmers have access to the high ecological and recreational values that green places provide and therefore there is a need to create inclusive public spaces. When discussing the integration of perennial edibles in the city's public green spaces, concerns were raised about the potential privatization of public land, a phenomenon currently observed in urban gardening initiatives. With increased involvement of the government, new possibilities arise. Increased involvement of the government in urban gardening practices leads to shared responsibilities which is beneficial for making the places accessible and inclusive. This provides opportunities for producing food for everyone to harvest. However, there are several challenges accompanied with public food production. It will be necessary to educate citizens on how to take care of the perennials and there is a conflict with mapping the places where it is allowed to harvest the food. Therefore, for the government to implement edible perennials in public greenery, a certain trust in the citizens is needed.

Another challenge that came forward in the interviews was the responsibility that the government needs to take when providing human food production, this is not something that the government wants to do, since food production is not viewed as one of the tasks of the city. Therefore, including edible perennials in public spaces should be based on collaboration between various actors, where the responsibilities and costs can be shared and where citizen involvement is seen as mandatory. Multiple stakeholder involvement is not only favourable for the government but also regarded as an opportunity for food production in public green spaces, since it results in co-production of public places. Furthermore, edible perennials need increased maintenance, for which currently there is no budget according to the district administrations. However, opportunities can be seen in the near future when the district administrations take back the maintenance duties in their organisation. This can lead to more cost-efficient maintenance, resulting in a higher remaining budget. This budget can, depending on the engagement of the city district be used for the increased maintenance that edible perennials require. As stressed previously, this requires active citizen involvement. Which should be, according to the results of the survey, not a problem but rather an opportunity. Other opportunities can be seen in the social benefits of gardening, which occurs through citizen involvement, and educational purposes.

Citizen involvement as well as co-creation are valuable assets that are being emphasised by the city and should be more amplified in urban green space governance. Considering the process of the establishment of guidelines for urban agriculture, it can be argued that not only the need for the transition towards a more collaborative governance structure in public green space is recognised, but it is already happening. This could be something that Randrup et al. (2017) already predicted when indicating that increased public involvement will offer future cooperation and development of green space management. As food production in public greenery has high citizens support, there is a high opportunity for including edible perennials in public spaces according to the city's emphasis on citizen dialogue in public space development. Including food production in public places can also be a good way to realize citizen involvement in place creation which leads to an enhanced sense of place and can have several contributing benefits.

Currently, the government of Stockholm acknowledges urban agriculture according to the policy documents and the process of establishing new guidelines. Furthermore, the city facilitates small scale food production in public green spaces for ecological purposes and through fruit trees. According to the interviews, there is also an aim of the city to increase urban gardening and there should be more places available for growing food. However, the government makes a distinction between trees and shrubs and other edible perennials when discussing the implementation in public green spaces. Due to the high maintenance and vulnerability, the city does not consider including more fragile perennials in public spaces. However, citizen engagement and collaborative governance might result in new prospects for future practices. Furthermore, existing projects regarding the inclusion of edible perennials in other cities in Sweden provide possibilities for the implementation of edible perennials in public green places in Stockholm. However, also here a distinction is made between edible perennials and shrubs and trees. When limiting the food production to nuts, herbs, flowers and fruits, there are various opportunities. In the case of Stockholm, creating more vibrant public spaces can be a good argument for the inclusion of edible perennials as strategy to turn unpopular places into often visited areas. Furthermore, edible perennials can increase the sense of place through ecological literacy, which is beneficial for public places. Also, the social aspect can be valuable, especially in socially deprived areas. It has to be taken into account that the implementation process takes time and money. However, when finished, the maintenance is not much higher than other vegetation and can be managed within local governments. According to the interview with the expert, active citizen involvement is not favourable when implementing shrubs and trees for food production. Hence the co-production in these practices is rather limited.

The inclusion of edible perennials in public spaces in cities can be seen as a way of rethinking the function of our public spaces and food system. With increased awareness on sustainability and urbanisation processes, the inclusion of food production in public spaces in cities could be the way of producing food for citizens in the future. The need for affordable food due to the inflation crisis and increased food security to be prepared for crisis situations can provide sufficient reasoning for the experimentation with edible perennials in public green place in Stockholm, especially since the implementation process and food production takes time. However, since it includes frequently used public spaces which are experiencing increased pressure due to urbanisation and the limited space available, how and to which extent the spaces should be used for food production can be debated and a distinction should be made between food from shrubs and trees and other edible perennials. This study can be seen as a first step in unpacking the complexity of the production of food in public spaces. Due to the restrictions of this study, the place specific research and the limited previous research in food production in public spaces, this study offers significant recommendations for future research. I would recommend further research into how food production in public spaces in Stockholm can look like, how citizens should be involved in public space planning and how co-production of public space can benefit food production in cities.

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9. Appendices

Appendix 1

Message posted on online platforms to receive respondents for survey

Hej!

Jag skriver min masteruppsats om matproduktion i offentliga grönområden i Stockholm. Jag skulle vilja veta ert perspektiv som medborgare i Stockholm till detta. Enkäten tar cirka 2 minuter. Tack på förhand!

Med vänliga hälsningar, Nienke

Hello!

I am writing my master thesis about food production in public green spaces in Stockholm. I would like to know your perspective as citizens in Stockholm towards this. The questionnaire will take approximately 2 minutes. Thank you in advance!

Kind regards, Nienke

Länk till frågeformulär:

https://www.surveymonkey.com/r/L65SMJ7

Appendix 2

Questionnaire in Swedish

Frågeformulär för invånare i Stockholm

Detta frågeformulär är en del av min masteruppsats vid KTH. Jag undersöker förutsättningarna för att öka lokal matproduktion i offentliga grönområden i Stockholm och invånarnas perspektiv på detta. Grönområden inkluderar till exempel parker, lekplatser, rekreationsområden och naturområden som ägs och underhålls av staden. Matproduktionen syftar här till exempelvis fruktträd, ätbara växter, örter och grönsaker beroende på grönområdets karaktär. Platserna är fritt tillgängliga för allmänheten och den producerade maten är avsedd för alla som besöker parkerna.

Frågeformuläret består av 5 frågor och tar ungefär 2 minuter att besvara. Tack för att du deltar!

1. Bor du i Stockholm?
   Ja / Nej

2. Hur värderar du lokal matproduktion?
   Viktigt
   Neutral
   Inte viktigt

3. Skulle du stödja matproduktion i offentliga grönområden i Stockholm?
   Ja
   Nej
   Ingen åsikt

4. Skulle du besöka offentliga grönområden oftare om de producerade mat?
   Ja, jag skulle gå oftare
   Det skulle inte påverka mina besök
   Nej, jag skulle gå mindre oftare

5. Skulle du vilja delta i initiativ för att producera mat i offentliga grönområden?
   Ja / Nej

Detta var slutet på frågeformuläret. Tack för din tid! Om du är intresserad av min forskning, ange din e-postadress så får du en uppdatering när jag har avslutat min uppsats.

Appendix 3

Questionnaire in English

Questionnaire citizens Stockholm

This questionnaire is part of my master thesis at KTH. I am doing research into the production of food in public green spaces in Stockholm and the perspective of citizens towards it. The spaces include e.g. parks, playgrounds, recreational areas and natural areas which are owned and maintained by the city administration. The food production consists of fruit trees, edible plants, nuts, herbs and vegetables depending on the characteristics of the green space. The places are freely accessible for the public and the food produced is meant for all park visitors.

The questionnaire consists of 5 questions and takes approximately 2 minutes. Thank you for participating!

1. Do you live in Stockholm?
   Yes / No

2. How do you value local food production?
   Important
   Neutral
   Not important

3. Would you support food production in public green spaces in Stockholm?
   Yes
   No
   No opinion

4. Would you visit public green spaces more often if they would produce food?
   Yes, I would go more often
   It wouldn't affect my visits
   No, I would go less often

5. Would you participate in initiatives to produce food in public green spaces?
   Yes / No

This was the end of the questionnaire. Thank you for your time! If you are interested in my research, enter your email and you will receive an update when I finished my thesis.

Appendix 4

Interview guides

Interview guide park engineer in city administration

This interview is part of my master thesis at KTH. I am doing research into the production of food in public green spaces in Stockholm. The food production will include edible perennials, trees, shrubs and plants that live for more than 2 years and regrow without needing to be replanted, to ensure limited maintenance. They can range from fruit trees, edible plants, nuts, herbs and vegetables. The areas are free accessible by the public and the food is meant for the citizens. For my thesis I am looking at the citizens perspective towards it and aim to understand the challenges and opportunities. In this interview I want to discuss the inclusion of food production in the maintenance plan for the public green spaces in the city district to understand the challenges and opportunities of this approach. Do you mind if I record this interview?

First I would like to ask some general questions about the Stadsdelsförvaltningen (district administration) in the city district; how is it linked to public spaces/parks in the district

What is your function in the Stadsdelsförvaltningen?

What does the district administration do in accordance to the public green spaces and parks in the city district? (maintenance, development, designing)

3. Which division is responsible?
4. What actions does the division undertake?
5. Are there contracting contractors hired?

Some city districts want to stop contracting contractors for the maintenance of their parks and green spaces and include park engineers in their division, is this a debate in your city district? Or is this already happening?

What are important aspects that are considered when developing and maintaining parks/ public green spaces in the district? Who decides what to plant?

Now I would to ask some questions about food production (edible perennials)

Is food production/urban agriculture a known subject in your department?

What is the view towards urban agriculture/food production in public spaces from your department?

What are the current regulations/guidelines regarding urban gardening/urban agriculture in the city district?

Now we move on to questions regarding the inclusion of food production in public green spaces in the city district

Can food production, edible perennials (fruit trees, edible plants) be implemented in public green spaces in the city district from the governmental perspective (your division)?

6. How do you think that the division will respond to it? Have you experimented with this?

7. And regarding the maintenance, do you see challenges? What is needed?
8. What can be the challenges?
9. What can be the opportunities?

Can the division decide this? Or who can?

Do you know of examples in other cities that include edible perennials in their parks or other green spaces? What do you think of it?

Is there something you want to add?

Thank you for participation in this interview and contributing to my research!

Interview guide Traffic administration

This interview is part of my master thesis at KTH. I am doing research into the production of food in public green spaces in Stockholm. The food production will include edible perennials, trees, shrubs and plants that live for more than 2 years and regrow without needing to be replanted, to ensure limited maintenance. They can range from fruit trees, edible plants, nuts, herbs and vegetables. The areas are free accessible by the public and the food is meant for the citizens. For my thesis I am looking at the citizens perspective towards it and aim to understand the challenges and opportunities. In this interview I want to discuss the inclusion of food production in public green spaces in city districts and the challenges and opportunities of this approach. Do you mind if I record this interview?

First I would like to ask some general questions about Traffikkontoret (the Traffic Administration of Stockholm Stad); how the department is linked to public green spaces/parks

What is your function regarding public green places in the city?

10. What actions does the Traffic Administration undertake regarding public green spaces?
    11. Who is responsible?
    12. Are there contracting contractors hired?

What are important aspects that are considered when designing the parks/public green spaces? Which functions are valued? Who decides what to plant?

Now I would like to ask you some questions about food production (edible perennials)

Is food production a known subject in Stockholm stad (traffic administration)? How is it valued?

What is the view towards urban agriculture/food production in public spaces from your department?

What are the current regulations/guidelines regarding urban gardening/urban agriculture?

Now we move on to questions regarding the inclusion of food production in public green spaces in Stockholm

You are working on a project about how city administration's should work with issues related to urban gardening within public owned areas. Could you tell me something about the project?

13. Does this include the whole area of Stockholm Stad?

14. Which issues/challenges are experienced?
15. What opportunities are you experiencing?

Can food production, edible perennials (fruit trees, edible plants) be implemented in public green spaces in Stockholm from the governmental perspective (Traffic Administration)?

Can Trafikkontoret decide this? Or who can?

Do you know of examples in other cities that include edible perennials in their parks or other green spaces? What do you think of it?

Is there something you want to add, do you have any questions?

Thank you for participation in this interview and contributing to my research!

Interview guide Development office

This interview is part of my master thesis at KTH. I am doing research into the production of food in public green spaces in Stockholm. The food production will include edible perennials, trees, shrubs and plants that live for more than 2 years and regrow without needing to be replanted, to ensure limited maintenance. They can range from fruit trees, edible plants, nuts, herbs and vegetables. The areas are free accessible by the public and the food is meant for the citizens. For my thesis I am looking at the citizens perspective towards it and aim to understand the challenges and opportunities. In this interview I want to discuss the inclusion of food production in the development and construction of public green spaces in the city district to understand the challenges and opportunities of this approach. Do you mind if I record this interview?

First I would like to ask some general questions about Exploateringskontoret (the development office); how is the department linked to public green spaces/parks

What is your function as part of the development office (Exploateringskontoret)?

What does the Exploateringskontoret do in accordance to the public green spaces and parks?

What is included in this work?

16. What actions do the division undertake?
17. Who is responsible?
18. Are there contracting contractors hired?

What are important aspects that are considered when designing/developing new park spaces/public green areas? Who decides what to plant?

Now I would like to ask you some questions about food production (edible perennials)

Is food production a known subject in your division?

What is the view towards urban agriculture/food production in public spaces from your department?

What are the current regulations/guidelines regarding urban gardening/urban agriculture?

Now we move on to questions regarding the inclusion of food production in public green spaces in the city district you are working in

Can food production, edible perennials (fruit trees, edible plants) be implemented in public green spaces in the city district from the governmental perspective (your division)?

19. How do you think that the division will respond to it? Have you experimented with this?
20. Do you see challenges (regarding maintenance, design)? What is needed?
21. What can be the opportunities?

Can your division decide this (Exploateringskontoret)? Or who can?

Do you know of examples in other cities that include edible perennials in their parks or other green spaces? What do you think of it?

Is there something you want to add?

Thank you for participation in this interview and contributing to my research!

Appendix 5

Guiding questions interview expert

First explain my research and outcomes

- Did you came across similar issues/opportunities, or did you experience it differently in your projects?
- Can you tell me about your projects? What did you do?
- Who were involved? And how was the collaboration?
- How was the local government involved?
- Where citizens involved in the process?
- What is your view on citizens involvement in projects regarding edible perennials in public spaces?
- Where there any issues/complications with the implementation?
- Which opportunities to you see for including edible perennials in public spaces?